INTEGRATED DECISION SUPPORT FRAMEWORK FOR COLLABORATIVE PRODUCT DEVELOPMENT

ABSTRACT OF THE DISCLOSURE

An integrated decision support framework is disclosed, in which different types of decision-drivers from numerous sources can be converted into a unified decision network including, for example, both mathematical and node-edge graph representations. A graph-theoretic algorithm may be applied to the large problem (unified decision network) to detect and separate strongly-connected components. The strongly-connected components represent sub-problems that can be solved simultaneously. A dependency propagation technique may be used to properly order the sub-problems so they can be processed and solved sequentially and correctly. Each strongly-connected component (small sub-problem) can be delegated to a suitable decision generator depending on the types of relations included in the component. For example, a numerical solution algorithm may be used to solve the ordered, numerical relations sub-problems; an algebraic solution algorithm may be used to solve the ordered, geometric relations sub-problems; and a logical inference engine (algorithm) may be used to solve the ordered, logical relations sub-problems. Solutions thus derived can be propagated to the next stage of the decision resolution process until a complete problem is solved.